

REMARKS

By this amendment, claims 1-8 remain pending in this application. Claims 1, 4 and 8 have been amended. No new matter is added. Claims 9 and 10 have been canceled. Applicants respectfully request reconsideration in view of the above amendments and the following remarks.

As discussed above, claims 9 and 10 have been canceled in favor of elected Group I, claims 1-8. Applicants reserve the right to pursue these canceled claims in this application and in others.

The Office Action rejects claim 4 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. In response, Applicants have amended the language of claim 4 to "[X] selected from A, B and C" form for exact consistency with the MPEP. The MPEP, Eighth Edition Revision 1, Volume II, Appendix AI (PCT) at pages AI-71 to AI-72 (Specifically, Example 20) and Training Materials For Examining Patent Applications with Respect to 35 U.S.C. Section 112, First Paragraph – Enablement Chemical/ Biotechnical Applications, released August, 1996, [<http://www.uspto.gov/web/offices/pac/dapp/1pecba.htm>], (Specifically, Examples H and J) make it clear that the phrase "X selected from A, B and C" is proper claim language. In view of the above, Applicants respectfully submit that amended claim 4 is in proper claim form under 35 U.S.C. § 112, second paragraph.

In the Office Action, claim 1 and 3-6 are rejected under 35 U.S.C. section 102(b) as being anticipated by Yano et al. (U.S. Patent No. 6,454,819). Claim 2 is rejected under 35 U.S.C. section 103(a) as being unpatentable over Yano in view of a Degussa sales brochure<sup>1</sup>. Claim 7 is

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<sup>1</sup> Note, no effective date has been provided by the Examiner for this reference.

rejected under 35 U.S.C. section 103(a) as being unpatentable over Yano in view of Misra et al. (U.S. Patent No. 6,530,967). Claim 8 is rejected under 35 U.S.C. section 103(a) as being unpatentable over Yano and Misra in view of Degussa. Applicants respectfully disagree.

The fumed silica abrasive of independent claim 1 for polishing tungsten and titanium requires, at least, that the abrasive be "entirely dispersed and diluted in an acidic pH". In other words, the fumed silica abrasive is entirely processed, for use in a slurry, in an acidic pH regime. The inventors have surprisingly discovered that a fumed silica abrasive that has only been processed at an acidic pH provides improved selectivity for polishing tungsten and titanium relative to dielectric layers.

For example, as indicated in paragraphs [0012] – [0017], the acidic fumed silica of the present invention is fabricated by initially filling a mixer with a predetermined volume of de-ionized water. Thereafter, a predetermined amount of acid is added to the water based upon the desired pH. After the addition of acid to the water, a mixer operates to mix the acid and water to form an acidic water solution. Next, fumed silica is dispersed in the water-acid solution in the mixer to a predetermined concentration. The high shear mixing breaks down the agglomerated structure of the dry fumed silica causing the viscosity to drop. Next, the dispersion is diluted by the addition of de-ionized water. The additional water is then mixed into the aqueous dispersion in the mixer. The amount of water added is an amount sufficient to lower the concentration of fumed silica in the aqueous dispersion to the desired final concentration. Note, the pH of the solution during dilution is maintained, preferably, between 1.5 to 5.5. Hence, the fumed silica abrasive is entirely processed in an acidic pH regime, as indicated in claim 1.

In contrast, Yano discloses a slurry that contains conventional fumed silica abrasive for polishing magnetic disks (see e.g., col. 18, lines 1-5 as cited by the Examiner). In particular, the

slurry of Yano utilizes Aerosil® 90 fumed silica abrasive that has a pH of 3.7 to 4.7. Apparently, the pH of the solution containing the fumed silica is considered by the Examiner to “read on” the feature of dispersing and diluting the fumed silica in an acidic pH. This is completely false and without merit. The acidic pH referred to in the claims of the instant invention is the pH at which the dispersion of the fumed silica takes place, not the pH of the final solution. The Examiner is cordially invited to point out with particularity those sections of the Yano disclosure or in the product description for the Aerosil® 90 fumed silica abrasive, which teaches the feature of “dispersing” the fumed silica in an acidic pH. Applicants respectfully submit that none of the cited references teach or even suggest this feature.

Note, the natural pH of the fumed silica in the final solution is acidic, due to the hydrochloric acid byproduct during the manufacture of fumed silica. In other words, the natural pH (e.g., pH of 3.7 to 4.7 of the Aerosil® 90 fumed silica abrasive samples) is a direct function of the residual acid left in the silica powder following acid mitigation. Hence, this (acidic) pH has nothing to do with processing of the fumed silica, in particular, dispersion of the fumed silica, but rather, the pH of the final solution that contains the conventionally processed fumed silica. Moreover, the pH provided in the product description of Aerosil® 90 fumed silica abrasive is not even low enough to perform the high shear step of the present invention. In other words, at a pH of 3.7 to 4.7, it would be nearly impossible to disperse the fumed silica. Note, since the isoelectric point (zero surface charge) for silica is around a pH of 2, (this is the point of low colloidal stability and the slurry will “gum up” and may interfere with the mixing equipment) the dispersion is conducted at a high pH in an effort to maintain the viscosity as low as possible. Accordingly, the disclosure of Yano does not suggest or teach the composition of claim 1 comprising an abrasive that has been entirely dispersed and diluted in an acidic pH.

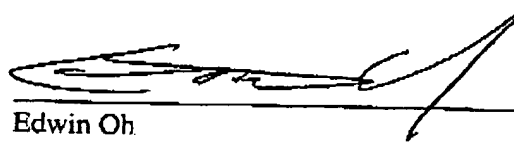
Similarly, claim 7 recites a composition for polishing tungsten and titanium containing an abrasive, wherein the abrasive is fumed silica that "has been entirely dispersed and diluted in an acidic pH". Accordingly, claim 7 should be allowable for at least the reasons as discussed above for claim 1. Also, claims 2 to 6 and 8 depend from claims 1 and 7 and should be allowable along with claims 1 and 7 for at least the reasons as discussed for claim 1 and for its own unique combination of features that are neither taught nor suggested by the cited art.

Misra is cited for a different feature and does not cure the deficiencies of Yano and/or Degussa.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Edwin Oh, Applicants' Attorney at 302-283-2137 so that such issues may be resolved as expeditiously as possible. For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully submitted,

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Date

  
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